# Social-Emotional Predictors of Postsecondary Enrollment for Students with Disabilities

by

Charles M. Kaprolet

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Graduate Supervisory Committee:

Amanda L. Sullivan, Chair
Linda C. Caterino
Chong Ho Yu

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ABSTRACT

The purpose of this exploratory study was to determine which social-emotional skills may predict postsecondary enrollment for students with disabilities. Students with disabilities are less likely to enroll in any form of postsecondary education and in turn experience poorer post-education outcomes than their general education peers. Using data from the second National Longitudinal Transition Study (NLTS2), a classification tree analysis was conducted on teacher-rated social-emotional behaviors in an attempt to determine which social-emotional skills were the strongest predictors of postsecondary enrollment. Items assessing social-emotional skills were selected from the second wave of teacher surveys based on their alignment with the broad taxonomy of social-emotional skills created by Caldarella and Merrell. The results of the classification tree analysis showed that one of the selected social-emotional items, teacher rated ability to follow directions, was the most significant predictor of postsecondary enrollment for students with disabilities. In general, the results suggest that compliance and, to a lesser extent, peer-relations skills, in addition to family income, predict postsecondary enrollment for students with high-incidence disabilities. This finding suggests that social-emotional skills play an important role in postsecondary enrollment for SWD, providing support for the use of social-emotional skills interventions in improving postsecondary enrollment rates and potentially post-educational outcomes for SWD.

# DEDICATION

For Sheralyn and Elise, the most amazing women in the world. Elise, you gave me the final push to make it to the end.

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# LITERATURE REVIEW

Students with disabilities (SWD) typically experience poorer post-educational outcomes in all areas than their peers without disabilities (US Department of Education, 2010). One of the gateways to improving these outcomes is through postsecondary education. On average, individuals who attend some form of postsecondary education earn more money over their lifetime (Day & Newburger, 2002), experience higher life expectancies (Lleras-Muney, 2005), and are more likely to obtain employment (Braddock, 1999) than individuals who do not obtain any postsecondary education. SWD, however, are much less likely to enroll in postsecondary education then their general education peers (Bureau of Labor Statistics, 2010; Newman, 2005).

There is a growing body of research on college readiness skills that has identified cognitive ability (Deary, 2007), academic achievement (Engberg & Wolniak, 2010), transition planning (Karge, Patton, & de la Garza, 1992), and social-emotional skills (Babbitt & White, 2002) as important components of student success. Notably, despite their identified disabilities, SWD possess many of the same skills in these areas as their general education peers. While they are identified with educational disabilities because of their lower academic skills, this is not the only identified predictor of postsecondary enrollment. There is currently little research examining the relationship of social-emotional skills to postsecondary enrollment rates for this population, despite being a factor that could respond well to intervention in primary and secondary schools. There is even less research exploring the augmentation of these skills to improve

postsecondary education rates for SWD. Thus, the goal of this exploratory study was to use data from the second National Longitudinal Transition Study (NLTS2) to describe the educational experiences of students with disabilities and to determine if social-emotional skills can predict postsecondary enrollment.

**The Importance of Educational Attainment**

Research on postsecondary enrollment and outcomes generally shows that postsecondary education can be critical to improving a vast array of outcomes for individuals (e.g., receipt of public assistance, lifetime earnings, and general health). Studies have systematically shown, for example, that high school graduation can help break the cycle of poverty experienced by families with low levels of education by improving economic status. Coelli, Green, and Warburton (2007) found that high school graduation reduced the likelihood of later receiving public assistance by 50 to 75 percent for students from welfare-recipient families.

Data on earning potential show an increasing disparity between individuals who do and do not attend postsecondary education. For instance, over a lifetime, a high school dropout earns approximately $260,000 less than a high school graduate and approximately $1 million less than a college graduate (Day & Newburger, 2002). Education levels also impact community economic status. Factoring in the impact of the estimated 1.2 million students who will not leave school within typical timeframes, it is estimated that the nation loses $312 billion in wages, taxes, and productivity annually (Rouse, 2005).

Data on other outcomes related to educational attainment demonstrate the far-reaching implications of college access and career readiness. Research has

shown that as little as one additional year of schooling can reduce the probability of mortality within the following 10 years by as much as 6 percentage points and add an additional one to seven years of life expectancy after age 35 (Lleras-Muney, 2005). Further, while not implying a causal relationship, data show that up to 75 percent of prison inmates do not have high school diplomas (Harlow, 2003). A recent Bureau of Justice Statistics report suggests that even a five percent increase in the number of male high school graduates each year could save approximately $4.9 billion in related crime costs annually (Harlow, 2003).

**Trends in Educational Access and Attainment**

According to the National Center for Education Statistics (NCES; Planty et al., 2009), in 2007, 8.7 percent of students dropped out before completing high school. Dropout rates vary widely by ethnicity, socioeconomic status, and disability status. Only 5.3 percent of Caucasian students dropped out in 2007, compared to 8.4 percent of African-American students and 21.4 percent of Hispanic students (Planty et al.). Additionally, low-income students were twice as likely as students from middle-income backgrounds and six times as likely as high-income students to drop out (Kaufman, Alt, & Chapman, 2001). SWD are also at a greater risk of dropping out of school, with research showing that almost 30 percent leave before finishing high school (Wagner, 2005). Of general education students who remain in school, almost 70 percent of 2009's graduating students enrolled in college (Bureau of Labor Statistics, 2010), compared to only 31.9 percent of SWD (Newman, 2005). Considering that approximately 19 percent of the adult population has a disability (Brault, 2008), this is a significant

portion of the population that is more likely to drop out of school and less likely to enroll in postsecondary education, which may have broad reaching implications for individual opportunities and national economics.

It is necessary to note that over time, postsecondary enrollment for all students has steadily increased (US Census Bureau, 2009a), becoming more accessible to a greater segment of the population. In general, approximately 48 percent of all high school graduates (aged 15-24) enroll in some form of postsecondary education immediately after completing high school (US Census Bureau, 2009b). Approximately 18.6 million students in the US were enrolled in college in 2008, up from 15.5 million in 1998 and from 10.9 million in 1988 (US Census Bureau, 2009a). Over the same 20 year period, Caucasian students saw an increase of 5.2 million, enrollment for African-American students more than doubled (increase of 1.3 million), and enrollment for Hispanic students more than tripled (increase of 1.5 million) (US Census Bureau, 2009a). Women aged 18 to 24 saw an increase of over 12 percent (US Census Bureau, 2009a).

Research has also shown increases in online postsecondary education programs (Gunawardena & McIsaac, 2004), technology implemented into classrooms (Groff & Mouza, 2008), study-abroad participation (Institute of International Education, 2009), and enrollment in two-year colleges (US Census Bureau, 2009a). With this increasing number of options and programs for accessing postsecondary education, higher education is becoming a reality for a larger number of students looking to meet the demands of the shifting job market (Braddock, 1999; US Department of Education, 2009). Indeed, it is estimated that

90 percent of the fastest-growing jobs in the country will require additional education beyond the high school level (US Department of Education, 2009). Consequently, there is concern that an increasing number of individuals will be unable to find employment as the requirements for attaining these jobs exceed the qualifications of those who either drop out or do not continue their education (Braddock, 1999; US Department of Education, 2009).

The federal government also recently emphasized the importance of increasing college readiness. In a report on the reauthorization of the Elementary and Secondary Education Act, the US Department of Education has stated that "every student should graduate from high school ready for college and a career, regardless of their income, race, ethnic or language background, or disability status" (2010, p. 3). To achieve this goal, funding has been made available to states for developing assessments and implementing interventions geared at increasing college and career readiness. Further, additional funding will be made available to support inclusion and postsecondary outcomes of SWD (US Department of Education). Thus, in order to be competitive in the job market, all students—including those with disabilities—may benefit from efforts to increase participation in postsecondary education.

**Educational Attainment of Students with Disabilities**

SWD represent a large, heterogonous group who typically experience poorer educational outcomes than students without disabilities. According to the Individuals with Disabilities Education Improvement Act of 2004 (IDEA), these students are generally provided services for a range of impairments, including

cognitive, developmental, emotional, learning, medical, physical, sensory, or speech/language (IDEA, 2004). Excluding cognitive impairments, the diagnosis of specific learning disabilities (SLD), speech/language impairments (SLI), and emotional disturbances (ED) do not necessarily translate to ability differences between those with disabilities and those without (Stage, Abbott, Jenkins, & Berninger, 2003; Stuebing, Fletcher, LeDoux, Lyon, Shaywitz, & Shaywitz, 2002). Students with reading disabilities, for example, have been shown to have similar skill profiles and to benefit most from the same interventions as students without disabilities (Stage et al., 2003; Stuebing et al., 2002). Additionally, students with these high-incidence disabilities (i.e., SLD, SLI, and ED) comprise approximately 70 percent of all students in special education (Data Accountability Center, 2010a), suggesting that a significant proportion of SWD may be as capable as their peers without disabilities of attending postsecondary education.

Yet, despite the typically average cognitive ability and lack of significant skill differences between SWD and students without disabilities, this distinctive group is much less likely to attend postsecondary education, as previously mentioned. This is notable given that approximately 60 percent of all SWD take general education classes, including 25 percent who take all of their courses in general education classrooms (Knokey, 2006). Data for students with high-incidence disabilities also show that these students access the curriculum similarly to peers without disabilities (Data Accountability Center, 2010b). Approximately 59 percent of students with SLD take over 80 percent of their classes in general education classrooms and over 88 percent taking at least 40 percent of their

classes in general education (Data Accountability Center, 2010b). For students with SLI, over 86 percent take at least 80 percent of their classes in general education classrooms (Data Accountability Center, 2010b). With this many SWD taking general education classes, it suggests that the vast majority of these students have the ability to learn within typical settings and perform similarly to their regular education peers in many academic areas with appropriate support (Jorgensen et al., 2005).

Since the early 1990's, the number of SWD who have successfully completed high school has steadily increased. Data from the 1994-1995 school year showed that approximately 42 percent of SWD graduated with diplomas, with 47.5 percent of SWD dropping out before graduating (US Department of Education, 2009). As of 2003-2004, approximately 54 percent of SWD graduated with a diploma, representing an increase of over 12 percent. In addition, the number of SWD dropping out of school has decreased to 31.1 percent, representing an overall decrease of over 16 percentage points (US Department of Education, 2009). The dropout rate for students with SLD and SLI was under 15 and eight percent, respectively (Data Accountability Center, 2010c). Of students who remained in special education throughout their education, 61 percent with SLD and approximately 67 percent with SLI graduate with diplomas (Data Accountability Center, 2010c). Clearly, an increasing number of SWD are successfully completing secondary education, suggesting that they may be better prepared than previous generations, and with proper supports and services may meet and overcome the same challenges as their typical peers (Gil, 2007).

Recent data suggest that only 31.9 percent of SWD enroll in any type of postsecondary education, up from 14.6 percent in the original NLTS in 1987 (Newman, 2005). While enrollment data for SWD are increasing, there is still a large gap in the postsecondary education rates between SWD and their peers without disabilities. These trends also have implications for students' employment. Historically, SWD have lower overall employment rates than peers without disabilities. As of 2000, this difference was 32 percent versus 81 percent for non-disabled peers (National Organization on Disability, 2000).

**Factors Influencing Postsecondary Enrollment**

With an increased emphasis on postsecondary education, it is important to evaluate students' overall college/postsecondary readiness and understand the factors associated with an increased likelihood of SWD pursuing postsecondary education. While there have been many strategies for increasing high school completion and postsecondary enrollment, including student-focused planning, student development, interagency collaboration, family involvement, program structuring (Test, Fowler, White, Richter, & Walker, 2009), and examination of numerous interpersonal factors affecting likelihood of enrollment (e.g., cognitive ability, academic achievement, and transition planning), one area in which research is particularly lacking is consideration of the potential role of social-emotional skills in supporting students' educational attainment. Research has shown that these skills are predictive of college readiness and overall academic achievement (Babbitt & White, 2002; Fleming et al., 2005), but their impact on postsecondary enrollment has received less attention. Thus, it was posited that if

certain types of skills can be identified as increasing the likelihood of a student pursuing postsecondary education, then educators could target those skills in SWD who may otherwise be less likely to continue their education after high school. While some of these factors are immutable and thus not subject to change, others leave room for intervention, suggesting that there are viable methods for increasing postsecondary enrollment. The following sections provide a brief review of the empirical support for factors influencing enrollment.

**Demographic variables**. Research on postsecondary education has identified several demographic variables that are correlated with probability of enrolling in postsecondary education. The statistics on gender differences in postsecondary enrollment, for example, have changed greatly over the last several decades (Carbonaro, Ellison, & Covay, 2010). Previously, males were more likely to attend postsecondary education, but that trend has recently shifted toward females being more likely to attend (Carbonaro et al., 2010). Additionally, education statistics continue to show differences in postsecondary attendance rates by ethnicity, with Caucasian students more likely to attend than Hispanic or African-American students (US Census Bureau, 2009a). Socioeconomic status is also a factor that is correlated with varying postsecondary enrollment. Students from households of low socioeconomic status (SES) are significantly less likely to attend postsecondary education than their middle to high SES peers (Alon, 2009).

**Cognitive ability**. Research has shown that one important factor related to educational attainment and postsecondary enrollment is cognitive ability (Anderson & Keith, 1997; Deary, 2007; Laidra, Pullman, & Allik, 2006). These

studies show a strong correlation between cognitive ability and academic achievement, which are both tied to positive post-school outcomes. While these studies do not separate the effects of cognitive ability and academic achievement, they show that cognitive ability is an important factor in school completion, postsecondary education, and favorable outcomes.

**Academic achievement**. Academic achievement is also a consistent predictor of college enrollment. Studies looking at differences in postsecondary enrollment across a multitude of variables, including high school GPA, highest level of math, socioeconomic status (SES), peer influence, and ethnicity have similar results (Engberg & Wolniak, 2010; Perna, 2000; Zarate & Gallimore, 2005). Generally, these studies show that among variables suited to intervention, GPA and academic ability can strongly predict postsecondary enrollment. Unfortunately, this is one likely cause of the disparity in postsecondary enrollment rates for SWD. Any student identified with a disability under IDEA must demonstrate an educational impact through poor academic achievement in the classroom and on standardized assessments (IDEA, 2004). If academic achievement is a strong predictor of postsecondary enrollment, then naturally SWD will be at a disadvantage in this area. Fortunately, it is not the only predictor, thus interventions can be targeted at other identified predictors.

**Transition planning**. While academic achievement and cognitive ability are important predictors of postsecondary enrollment and success, transition planning may also play a predictive role in postsecondary enrollment for SWD. Under IDEA, students ages 16 and older are required to be provided with

transition services in order to teach them the skills to find and maintain employment or further education, how to access supports in the community, and how to advocate for their needs (IDEA, 2004; Karge, Patton, & Garza, 1992). The quality of these services, then, impacts the likelihood of a student enrolling on postsecondary education. SWD receiving transition services typically receive, in order of most to least frequently provided, the following services: counseling on postsecondary options, job search skills, job-related academics, job maintenance skills, and referrals to adult agencies (Karge et al., 1992). However, research on the implementation of these facets of transition planning suggests that many students are not provided with appropriate transition planning (Karge et al., 1992, Krebs, 2002; Lock & Layton, 2001; Skinner, 2004), which may help explain the disparity in postsecondary enrollment rates.

Literature reviews on transition services for SWD suggest that despite the lack of services provided, particularly to students with high-incidence disabilities, these students would benefit most from job maintenance skills, self-advocacy training, transition plans two years prior to graduation, job search skills, and job-related academics (Karge et al., 1992). Self-advocacy skills, something that is not one of the most likely areas to be addressed by transition services, has also been identified as a critical component of college readiness in more recent research (Krebs, 2002; Lock & Layton, 2001; Skinner, 2004).

Adequate transition planning is especially important because when students enter postsecondary institutions, the responsibility for identifying necessary supports shifts from the school to the individual student. If students are

unaware of their rights and responsibilities, they are less likely to receive or seek out these services (Gil, 2007). Thus, an important component of the transition from high school to postsecondary education is fostering self-determination and self-advocacy, a skill that is inherently social-emotional (Gil, 2007). Hitchings, Retish, and Horvath's (2005) study on the postsecondary preparation of SWD identified a lack of appropriate transition plans supportive of postsecondary education, leading the authors to argue that transition plans addressing social skills, academic skills, and expectations were needed for success beyond high school. Thus, the quality of transition services may also increase the postsecondary enrollment rates for SWD.

**Social-emotional skills**. Generally, research has indicated the importance of social-emotional skills in improving social outcomes, academic outcomes, college readiness, and transition services for all students (Babbitt & White, 2002; Fleming et al., 2005; Frey, Nolen, Van Schoiack-Edstrom, & Hirschstein, 2005), yet there are potential skill differences among students based on demographic variables such as gender, ethnicity, and SES. Studies have identified differences in social-emotional skills use across gender and ethnicity (Copeland & Hess, 1995), as well as differences in measured skill levels across gender and socioeconomic status (Briggs-Gowan, Carter, Skuban, & Horwitz, 2001). In both areas of research, girls have been found to both use and possess higher levels of social-emotional competence. While Copeland and Hess (1995) also found that Hispanic students were more likely to initiate social activities when distressed, West, Denton, and Reaney (2001) found skill differences across gender and

socioeconomic status, with low socioeconomic status correlated with lower social-emotional skills. Specifically, both females and students from higher SES households were more likely to accept peer ideas, form friendships, and comfort others (West et al.).

However, proponents of teaching social-emotional skills argue that if these skills are instilled in all students throughout their schooling they will be more likely to demonstrate these skills throughout their lives (Zins & Elias, 2006). The correlation between pro-social behavior and academic achievement is also well documented (Fleming et al., 2005; Wentzel, Weinberger, Ford, & Feldman, 1990). These studies have shown that social-emotional skill development in elementary school students can both increase general academic achievement and predict standardized test performance in secondary educational settings.

Within the school environment, social-emotional skill deficits can broadly result in difficulty attaining desired social status among peers, which has also been linked to poor academic achievement, school dropout, and decreased likelihood of attending postsecondary education (Coie, Terry, Lenox, & Lochman, 1995; Lopez & DuBois, 2005). Increased problem behaviors can also result in vast amounts of valuable instructional time spent on discipline issues instead of academics, which is an additional threat to students' overall achievement (Lewis, 2001). Students who experience difficulty relating to peers in elementary school have been shown to be more likely to be diagnosed with both internalizing and externalizing disorders later in adolescence (Coie et al.,

1995). In addition, for middle school students, inability to relate to peers has been linked to low self-esteem and later adjustment problems (Lopez & Dubois, 2005).

Furthermore, several of the identified college-readiness skills, including self-awareness, skills helping develop social supports, and personal responsibility, are fundamentally social-emotional (Babbitt & White, 2002). Thus, developing these skills in SWD can be an important bridge to increasing their likelihood of enrolling in postsecondary education. Lane and colleagues (2006) conducted a study comparing the academic, social, and behavioral skills in SWD compared to peers without disabilities. Their results showed that SWD, particularly those with ED, scored lower than peers without disabilities on measures of social competence (2006). The researchers also argued that because of the typically poor outcomes for these students, "substantial efforts must be directed toward identifying skill deficits and intervening in the necessary target areas" (p. 113). Alwell and Cobb (2009) conducted a meta-analysis on strategies for improving transition outcomes for SWD. This study found support, albeit modest, for social skills training (SST) as the most effective method for improving outcomes, particularly for secondary-aged SWD.

In addition, several studies have suggested that these skills are critical for a successful transition for SWD. Adreon and Durocher (2007) found that social-emotional skills were important for successful postsecondary transition for students with autism spectrum disorders, whereas Sabbatino and Macrine (2007) evaluated the efficacy of a transition program for SWD and found that social-emotional skills were a pillar of this successful program. Further, Webb and

colleagues (2008) conducted a literature review encompassing the prior 12 years of research on promoting transitions to postsecondary education for SWD. This study identified five areas needed for SWD: self-determination, academic preparation, accommodations, assistive technology, and social skills (2008). At the postsecondary level, Janiga and Costenbader (2002) conducted a survey of college service coordinators regarding the preparedness of SWD, specifically those diagnosed with SLD. Service coordinators were found to be broadly dissatisfied with the quality of existing transition services, specifically self-advocacy skills and SST (2002). Considering the inconsistent findings on the efficacy of social-emotional skills training, studies showing postsecondary dissatisfaction with the preparedness of SWD, and a general dearth of studies, additional research is needed in this area.

**Summary**

Due to growing federal concerns and goals regarding education and career readiness for all students (US Department of Education, 2010), educators and researchers are increasingly focused on identifying empirically-based strategies for meeting these goals. Postsecondary enrollment for all students has steadily increased each year (US Census Bureau, 2009a), consistent with the increasing demand for postsecondary education throughout the job market. While increases have also occurred for SWD, they remain substantially less likely to obtain employment (National Organization on Disability, 2000) or enroll in postsecondary education than their peers without disabilities (Newman, 2005).

Prominent literature on college readiness shows that academic skills are important factors in preparing a student for postsecondary education; however, they are not the only identified factors, suggesting that SWD who struggle academically are not precluded from furthering their education and remaining competitive in the work force. In addition to academic skills, research on college readiness has identified cognitive ability, academic preparedness, transition planning, self-awareness skills, social supports, personal responsibility, and social-emotional skills as important factors (Babbitt & White, 2002; Synatschk, 1995). Krebs (2002), Lock and Layton (2001), and Skinner (2004) also argued that self-advocacy skills are specifically needed for students with learning disabilities who may need to access disability services once attending a postsecondary institution. Generally, because of the differences between high school and college, college readiness cannot be measured by school success alone (Conley, 2007).

Thus, the factors involved in assessing a student's likelihood of attending postsecondary education are diverse and complex. Many factors, such as cognitive ability, clearly play a large role in one's likelihood of attending and ability to succeed in postsecondary education (Deary, 2007), but do not always readily lend themselves to intervention. While academic achievement may currently receive more support from an intervention standpoint, SWD are identified as such because of disabilities that limit their ability to access the academic curriculum or their ability to respond to interventions (IDEA, 2004). Transition planning services are also important, with the research suggesting that

social-emotional skills are a relevant component of this factor (Karge et al., 1992). Additionally, social-emotional skills can influence academic achievement (Fleming et al., 2005), decrease later maladaptive behaviors (Frey, Nolen, Van Schoiack-Edstrom, & Hirschstein, 2005), and help to predict postsecondary enrollment for students who have not been diagnosed with a disability (Perna, 2000; Zarate & Gallimore, 2005). Identification of the most critical social-emotional skills, then, can be an important component in increasing enrollment for SWD because of their broad influence on many of the dynamic factors that influence postsecondary enrollment. Support for development of appropriate social-emotional skills may increase the likelihood of postsecondary enrollment by preventing later disorders and by increasing college readiness (Babbitt & White, 2002). Accordingly, while there are many factors contributing to postsecondary enrollment, such as cognitive ability, academic skills, transition planning, and social-emotional skills (Horn, Cataldi, & Sikora, 2005; Babbitt & White, 2002; Rohde & Thompson, 2007), this study focused on using social-emotional skills as predictors of postsecondary enrollment for SWD.

**Research gaps**. There are several inconsistencies in the research on social-emotional skills and postsecondary education for SWD. Few studies have been able to identify a strong relationship between social-emotional skills intervention and positive outcomes for SWD, yet Alwell and Cobb (2009) found that social-emotional skills training was the strongest method of improving outcomes for secondary SWD. In light of conflicting results, it is interesting to note that several of the more recent meta-analyses examining the effectiveness of

social-emotional skills training found that targeted social-emotional skills in previous studies were not always socially valid for improving outcomes and that social-emotional skills training was often conducted without regard to the individual deficits and needs of the students (Cartledge, 2005; Maag, 2005). In addition, social-emotional skills are an important component of identified college readiness skills, which by definition are the skills needed to prepare a student for postsecondary education, yet there is little focus in the literature on the impact of social-emotional skills in this area (Babbitt & White, 2002). Thus, additional studies are needed that focus on the effects of social-emotional skills training on postsecondary enrollment for SWD.

There is also little research examining whether SWD possess the necessary skills or resources, also discussed in terms of "social capital" (Trainor, 2008), to access the transition services available in secondary education settings. Social capital, a topic that has more recently been applied to education, refers to the tangible and symbolic resources that develop from someone's ability to utilize social networks to connect to society (Trainor). Without ensuring that SWD possess the critical social-emotional skills to effectively access resources, thus increasing their social capital, researchers argue that it will be increasingly difficult to improve the postsecondary outcomes for SWD (Trainor). College readiness literature also identifies social-emotional skills as important for a successful transition to postsecondary education, but there is little research on the importance of these skills across different stages of development. Additionally, there is a general lack of research on strategies for improving postsecondary

outcomes specifically for SWD. Statistics on academic engagement and high school completion suggest that SWD are capable of attaining similar high school completion rates as peers without disabilities (Knokey, 2006; Stage et al., 2003; Stuebing et al., 2002), yet they are far less likely to enroll in postsecondary education (Newman, 2005), further hindering their ability to secure employment (US Department of Education, 2006).

Research is needed to determine whether these skills predict postsecondary enrollment or whether they serve more of a protective role when students enter postsecondary institutions. If these skills predict enrollment for SWD, then it could provide some guidance for the provision of resources and intervention efforts.

**Present Study**

The present exploratory study utilized longitudinal data from the NLTS2 to examine the impact of social-emotional skills in predicting postsecondary enrollment among SWD. The goal of this research was to determine whether social-emotional skills predict postsecondary enrollment for students with high-incidence disabilities. High-incidence disabilities, including SLD, SLI, and ED, were selected for this study because, by definition, they rule out cognitive impairment for eligibility (IDEA, 2004). Postsecondary enrollment is substantially lower for these students (Bureau of Labor Statistics, 2010; Newman, 2005) than would be expected given the lack of cognitive impairments among these groups. Additionally, there is no measure of cognitive ability available in the NLTS2 dataset, further emphasizing the importance of selecting disabilities

that are less likely be impacted by impaired cognitive ability. While the high incidence disabilities selected for this study preclude low overall cognitive ability, this does not protect the dataset from the influence of more specific processing deficits that may exist in identified SWD. Recent research has shown that there are significant differences in cognitive processing abilities between SWD and general education peers, including expressive/receptive language and processing speed, suggesting that this may be an explanation for some of the differences in postsecondary enrollment rates for SWD (Johnson, Humphrey, Mellard, Woods, & Swanson, 2010).

Research on social-emotional skills has shown they are an important component of college readiness skills (Babbitt & White, 2002) and can increase academic achievement (Fleming et al., 2005), both of which predict postsecondary enrollment (Engberg & Wolniak, 2010; Perna, 2000; Zarate & Gallimore, 2005). Thus, if social-emotional skills help prepare students for college and can increase academic achievement, it may be beneficial to determine which specific skills can increase the likelihood of postsecondary enrollment so that they can be targeted for intervention in order to lessen the gap in postsecondary attendance rates between students with and without disabilities. Specifically, this study used standardized measures of reading comprehension and applied mathematics performance to gauge students' existing levels of academic achievement. Data on high school GPA were available, but not chosen due to concerns regarding potential subjectivity and grades obtained from courses using modified curricula.

**Selected social-emotional skills**. The skills selected for this study, as measured through general and special education teacher observations of behaviors, were chosen based on their similarity to the broad taxonomy of social-emotional skills developed by Caldarella and Merrell (1996) in their review of 21 empirically-based studies and program manuals published between 1974 and 1994. The studies and manuals were analyzed based on the descriptions of their methodology, identification of the common dimensions of social skills, factor analysis procedures on the identified skills, and their individual creation of a taxonomy of social-emotional skills. Based on the most frequently occurring factors of social-emotional skills, Caldarella and Merrell (1996) identified peer relations skills, self-management skills, academic skills, compliance skills, and assertion skills as the broad social-emotional factors, each of which was comprised of six to twelve specific skills. For the present study, teacher ratings of classroom social-emotional behavior were used to assess the presence of social-emotional skills in SWD. Data collected from both general education and special education teachers were included in this study. Additionally, an overall social-emotional skills score was computed and utilized based on aggregate scores on individual social-emotional items in order to capture student's general functioning in this domain.

Peer relations skills were defined by Caldarella and Merrell (1996) as skills leading to positive interactions with peers and included social interaction, interpersonal skills, empathy, social participation, and general peer sociability. Self-management skills were defined as skills that allow a youth to control his or

her temper, respect imposed limits, and compromise. Additional examples included self-control, social independence, social responsibility, understanding social rules, and frustration tolerance. Academic skills were those skills relating to functioning in the academic environment, reflecting a youth who could be defined as productive and independent in the classroom, including accomplishing tasks, completing assignments, appropriate use of free time, organization, and asking for help. Compliance skills were defined as skills relating to following social rules and expectations. These included cooperation, following instructions and rules, sharing materials, and responding appropriately to constructive criticism. Last, assertion skills related to students who may be described as outgoing or extroverted. Assertion skills included initiating conversations, inviting others to play or work, and self-confidence (Caldarella & Merrell).

The present study explored the relationship between postsecondary enrollment and social-emotional skills correlating to the four domains of social-emotional skills identified by Calderella and Merrell (1996)—peer relations, self-management, compliance, and assertion. The academic skills domain was omitted because examination of the specific skills included in this factor suggested that it be may be confounded with the other identified domains and was regarded as less purely social-emotional than the other four factors. In addition, academic achievement has already been established as a strong predictor of postsecondary enrollment (Engberg & Wolniak, 2010) and specific academic variables were included in this study. Thus, as the focus of this study was strictly on the influence of social-emotional skills on postsecondary enrollment, the academic

skills domain was not included. Ideally, identification of the most critical skills would lead to interventions developed in educational settings that are already tasked with preparing students for postsecondary education (Karge, Patton, & Garza, 1992).

While research based on single-item data should be interpreted carefully, studies have shown that single-item scales and measures can produce robust results, in some cases very similar to studies using multi-item scales (Robins, Hendin, & Trzesniewski, 2001; Wanous, Reichers, & Hudy, 1997). Psychological research on more narrow constructs, such as expectancy theory (i.e., the probability that effort leads to performance), commonly uses single-item measures to conduct analyses (Ilgen, Nebeker, & Pritchard, 1981; Sackett & Larson, 1990), whereas complex psychological constructs typically are measured with multi-item scales (Wanous et al., 1997). An additional study examining global self-esteem measures also found that a single-item measure of self-esteem (the Single-Item Self-Esteem Scale) possessed the necessary reliability and validity to be used as a practical alternative to a multi-item self-esteem scale (Robins et al., 2001). Generally, researchers have suggested that such findings "…be interpreted…as a case for the acceptability of single-item measures when either the research question implies their use or when situational constraints limit or prevent the use of scales" (Wanous et al., 1997; p. 250). Additionally, as previously discussed, the focus of this study was on measuring social-emotional skills as reported by classroom teachers, and not on the fit of those observed behaviors to Caldarella and Merrell's identified model (1996). Thus, the use of

single items that were representative of the definitions of more specific constructs of social-emotional skills appeared to be warranted for this exploratory study.

**Theoretical assumptions**. This study was based on several assumptions regarding the impact of social-emotional skills on educational outcomes. The first assumption was that effective social-emotional skills can increase academic achievement (Fleming et al., 2005; Wentzel et al., 1990). Studies looking at the relationship between social-emotional skills and academic ability have shown that teaching social-emotional skills can successfully predict later academic performance in students exposed to the social-emotional skills curriculum (Fleming et al., 2005). This link was important in this study because of the identified relationship between academic ability and postsecondary enrollment (Engberg & Wolniak, 2010; Perna, 2000; Zarate & Gallimore, 2005), suggesting that social-emotional skills could be predictors of enrollment due to their influence on both social and academic functioning.

Second, this study assumed that social-emotional skills are a vital component of college readiness and can prepare SWD for the postsecondary environment. Research on college readiness has shown that social skills, self-awareness, and self-advocacy are critical components of college readiness for SWD (Babbitt & White, 2002; Skinner, 2004; Synatschk, 1995). If these students have the skills to be prepared for postsecondary enrollment and the ability to access supports and services, they can likely perform at the same level of peers without disabilities in the postsecondary environment.

Additionally, this research assumed social-emotional skills can increase the likelihood of a student enrolling in postsecondary education. While there are few studies explicitly evaluating social-emotional skills and their impact on postsecondary enrollment for SWD, those that have been conducted suggest social-emotional skills are a vital component of postsecondary preparation (Webb et al., 2008). While not a focus of this study, it is nonetheless important to identify the assumption that social-emotional skills can also provide lasting effects on postsecondary enrollment, justifying the importance of studying skills that can improve enrollment. As identified by Tinto's social integration theory, postsecondary retention is facilitated by students' ability to fully integrate themselves into the postsecondary environment and connect with peers and professors (1975).

Last, this study assumed that the broad construct of social-emotional skills can be effectively evaluated using teacher-reported skills mirroring identified factors of social-emotional skills. These factors, as explored by Caldarella and Merrell (1996), are peer relations skills, self-management skills, academic skills, compliance skills, and assertion skills. Their study examined articles from a 20 year period and identified the most common groupings of social-emotional skills. This taxonomy is also consistent with published social-emotional skills programs and curricula, including Second Step (Committee for Children, 1986) and Character Counts (Josephson Institute, 2010).

**Research question and hypothesis**. Given the existing research, the purpose of this study was to explore the educational experiences of SWD and to

determine if social-emotional skills contribute to postsecondary enrollment following exit from secondary institutions. Thus, this study first described the post-secondary educational experiences of students with disabilities in order to understand what educational options are pursued by this population. This study then determined which social-emotional skills best predicted postsecondary enrollment for SWD. Based on previous research that has identified the importance of social-emotional skills for college readiness and transition services to postsecondary education, it was hypothesized that the presence of social-emotional skills, as identified by teacher report, would predict postsecondary enrollment for SWD. Due to a lack of research on specific social-emotional skills and their relationship to postsecondary enrollment, this study did not hypothesize which social-emotional skills were more likely to contribute to postsecondary enrollment for SWD. As this study was exploratory in nature, the exploratory analyses selected for this study were utilized to determine the individual predictive power of the selected social-emotional skills. Thus, specific directional hypotheses were not offered; instead, this study explored whether teacher ratings of these skills and/or overall classroom social behavior ratings were useful in predicting post-secondary educational outcomes.

# METHOD

## Data Source

Data from the National Longitudinal Transition Study-2 (NLTS2) were used to determine which social-emotional skills are the strongest predictors of postsecondary enrollment for SWD. The US Department of Education, Office of Special Education Programs (OSEP) commissioned the NLTS2 to assess the implementation of the 1997 amendments to IDEA (Valdes, Godard, Williamson, Van Campen, McCracken, Jones, & Cameto, 2006). Data collection for the NLTS2 was conducted by SRI International on the behalf of the Institute of Educational Science (IES).

The NLTS2 was conducted utilizing a nationally representative sample of almost 12,000 students, ages 13 to 16, who were receiving special education services and were in 7th –12th grades as of December 1, 2000. Data were collected on their experiences at school and away from school throughout their secondary schooling and transitions to adult life (Wagner, Kutash, Duchnowski, & Epstein, 2005). The study aimed to describe the characteristics of secondary school students with disabilities and their school experiences, as well as post-school experiences by following their transitions after leaving secondary school, by measuring school and post-school outcomes, and identifying factors that lead to positive outcomes (SRI International, 2010a).

Data on students were collected both directly and indirectly from several sources. Direct assessment data were collected from students via reading, math, science, and social studies assessments, as well as self-concept, self-

determination, and friendship interaction rating scales. Indirect data were collected from parents/guardians, school staff familiar with the students, general education teachers, special education teachers, and school staff who were able to describe each school. Information from parents or guardians was collected through telephone interviews and mail surveys. Data from special education staff familiar with the students were collected via surveys regarding the courses taken by students and the setting in which those courses occurred (i.e., general or special education). These data also included information on programs and support services provided to students, as well as their school performance. Data from general and special education teachers were collected via surveys to obtain information specifically regarding the classes, instructional practices, and the effectiveness of the practices with the entire class. Lastly, school staff able to describe students' schools (e.g., administrators) were surveyed on the characteristics and specific policies pertaining to SWD for all schools with NLTS2 study members (Knokey, 2006).

In total, 11,276 SWD from 501 school districts or local education agencies (LEA), as well as 38 state-supported schools, were included in the study. Following completion of the fifth wave of the study, 3,606 SWD were reported to have left high school and approximately 1,977 reported enrolling in at least one course at a postsecondary institution (SRI International, 2010b).

**Study design**. The NLTS2 utilized complex sampling of youth with disabilities nested within LEA's and other state-supported schools. Sampling was conducted through a longitudinal design, using multiple methods of data

collection, and from multiple respondents. Sampling occurred in two stages, including a sample of LEA's and a sample of youth with disabilities within the LEA's that participated in the study. A stratified random sample of students receiving special education services was conducted through LEA's and state-supported schools. Student data were stratified by disability category to ensure national representativeness of each included disability category (Valdes et al., 2006).

To achieve national representation, data were stratified based on region, LEA size, and LEA/community wealth. The regions included in the study were Northeast, Midwest, Southeast, and West. LEA size was sorted into four categories, from small to very large, based on students served. Wealth was accounted for based on the proportion of the LEA student population living below the federal poverty level. Student wealth was classified into one of four categories, ranging from low to very high, with each category comprising 25 percent of the student population. Data were weighted based on an underrepresentation of African American and college-bound students and an overrepresentation of Hispanic students and rural LEA's (Wagner et al., 2005).

**Weighting**. The NLTS2 dataset was weighted based on two different sampling weights, full sample weights and replicate weights, in order to accurately estimate true population values for US SWD between ages 13 and 16 in 2000 , as well as to ensure that standard error of measurement is accurately accounted for in the sample. Full sample weights were computed based on LEA characteristics, students' disabilities, and the response rate for each instrument.

Replicate weights were computed similarly to the full sample weights, but were only derived from half of the LEA sample. There is one full sample weight and 32 replicate weights for each instrument at each data collection point (Valdes et al., 2006). Generally, sampling weights were created to ensure that low-incidence populations are adequately represented in the sample and because of lack of uniformity in the nonresponse rates across subgroups (SRI International, 2008). Full sample weights were created for each instrument to address the differences between the sample and the population, whereas replicate weights were created to create correct standard error estimates for each instrument.

**Instrument validation**. NLTS2 instruments were pretested with their respective participants (teachers, principals, parents, or students), as were the direct assessments and interview protocols (SRI International, 2000). Pretesting was conducted to determine the time needed for administration, respondents' comprehension of the directions, content, and format, analysis of item characteristics such as believability of responses, variation of responses, and appropriateness of the protocols, the logical low and skip patterns of the interview protocols, the logistics of the sequence of activities, and the use of accommodations for direct assessments (SRI International, 2000).

## Analytic Sample

For the present study, only students with high-incidence disabilities, comprised of SLD, SLI, and ED, were used for analyses. By definition, these students do not have cognitive or functional disabilities that would greatly decrease their likelihood of attending postsecondary education. Analyses were

conducted using all students in the database identified as having one of these three disabilities for which social-emotional data were reported, based on the instrument with the smallest sample size in order to minimize missing data. Based on previously reported poor correlations between survey informants (Achenbach, McConaughy, & Howell, 1987) and the educational focus of this study, this study focused solely on data obtained from general and special education teachers during the second wave of NLTS2 data collection. Identification of the disability status of students was conducted based on reports from the included school districts. Districts were asked to provide lists of special education students, as identified in accordance with the Individuals with Disabilities Education Act (IDEA; SRI International, 2010a). See Tables 1 and 2 for a breakdown of the characteristics of the unweighted and weighted analytic sample.

Table 1

*Characteristics of the Unweighted Analytic Sample by Disability**

| Characteristic | | SLD | SLI | ED | Total Sample |
|---|---|---|---|---|---|
| Total | | 170 | 180 | 70 | 420 |
| Gender | Male | 120 | 110 | 50 | 280 |
| | Female | 40 | 80 | 20 | 140 |
| | Total | 170 | 180 | 70 | 420 |
| Postsecondary Education | Yes | 70 | 90 | 20 | 190 |
| | No | 50 | 60 | 30 | 130 |
| | Total | 120 | 140 | 50 | 320 |
| Income | <$25,000 | 40 | 40 | 20 | 100 |
| | $25,001-$50,000 | 50 | 50 | 20 | 130 |
| | >$50,000 | 60 | 80 | 20 | 160 |
| | Total | 160 | 170 | 60 | 390 |
| Ethnicity | White | 120 | 120 | 50 | 290 |
| | African-American | 20 | 40 | 10 | 70 |
| | Hispanic | 20 | 10 | 10 | 40 |
| | Asian/Pacific Islander | 0 | 10 | 0 | 10 |
| | American Indian/Alaska Native | 0 | 0 | 0 | 0 |
| | Multi/Other | 0 | 0 | 0 | 0 |
| | Total | 170 | 180 | 70 | 420 |

*Note:* All cells were rounded to the nearest 10 to protect confidentiality of respondents.

Table 2

*Characteristics of the Weighted Analytic Sample by Disability*

| | | SLD | SLI | ED | Total sample |
|---|---|---|---|---|---|
| Total | | 686,567 | 44,496 | 114,134 | 845,197 |
| Gender | Male | 487,351 | 26,956 | 94,206 | 608,513 |
| | Female | 199,216 | 17,540 | 19,928 | 236,684 |
| | Total | 686,567 | 44,496 | 114,134 | 845,197 |
| Postsecondary Education | Yes | 271,057 | 13,071 | 34,981 | 319,109 |
| | No | 267,576 | 23,404 | 59,570 | 350,550 |
| | Total | 538,633 | 36,475 | 94,551 | 669,659 |
| Income | <$25,000 | 205,840 | 10,634 | 24,836 | 241,310 |
| | $25,001-$50,000 | 229,230 | 13,398 | 52,118 | 294,746 |
| | >$50,000 | 216,049 | 17,833 | 30,421 | 264,303 |
| | Total | 651,119 | 41,865 | 107,375 | 800,359 |
| Ethnicity | White | 487,295 | 28,595 | 75,117 | 591,007 |
| | African-American | 62,779 | 10,326 | 23,379 | 96,484 |
| | Hispanic | 96,485 | 3836 | 13,713 | 114,034 |
| | Asian/Pacific Islander | 11,516 | 1586 | 1924 | 15,026 |
| | American Indian/Alaska Native | 2653 | 155 | 0 | 2808 |
| | Multi/Other | 25,840 | 0 | 0 | 25,840 |
| | Total | 686,568 | 44,498 | 114,133 | 845,199 |

**Variables**

The social-emotional data that were used as independent variables in this study were collected during wave two from the teacher surveys and school program surveys. These surveys asked general education teachers and special education case managers to give some background information on the class in

which the specific student was enrolled, instructional practices used with the student, and how the student related to peers in the class (Knokey, 2006). Social-emotional items were selected to approximate the taxonomy for social-emotional skills created by Caldarella and Merrell (1996). The independent variables in this study were comprised of the regular and special education teacher-rated items that reflect the following social-emotional behaviors: peer relations skills, self-management skills, compliance skills, assertion skills, and an aggregate social-emotional skills score. Selected items for this study were aligned with definitions of the broad social-emotional factors and represent similar items from the original Caldarella and Merrell study. The selected items, their related factor, the definition of each factor, and the variable names are included in Table 3. See Tables 4 and 5 for breakdowns of general and special education teacher ratings of students receiving special education services under the categories of SLD, SLI, and ED. Each student in the sample was rated by both general and special education teachers.

Table 3

*Related Factors, Definition, Selected Items, and Variable Names*

| Factor | Definition | Item | Variable names |
|---|---|---|---|
| Peer relations | Skills that lead to positive interactions with peers | How well does this student get along with other students? | Nts2C1a; Npr2D18a |
| Self-management skills | Skills that allow a youth to control his or her temper, respect imposed limits, and compromise | How well does this student control his or her behavior to act appropriately in class? | Nts2C1c; Npr2D18c |
| Compliance skills | Skills relating to following social rules and expectations | How well does this student follow directions? | Nts2C1b; Npr2D18b |
| Assertion skills | Skills that allow students to initiate conversations, invite others to play or work, and self-confidence | How well does this student ask for what s/he needs in order to do his or her best in class? | Nts2C1d; Npr2D18d |
| Social-emotional skills aggregate | Sum of individual items from general and special education teachers | Sum of individual items from general and special education teachers | N/A |

Table 4

*General Education Teacher Report of Social-Emotional Functioning for Students by Disability*

| Item | Response choices | Total sample | SLD | SLI | ED |
|---|---|---|---|---|---|
| Ask for what they need | | 1700** | 230 | 260 | 100 |
| | Not at all well | 6.0% | 5.3% | 7.7% | 9.0% |
| | Not very well | 23.7% | 22.2% | 16.8% | 32.6% |
| | Well | 43.7% | 49.5% | 37.4% | 29.5% |
| | Very well | 26.7% | 23% | 38% | 28.8% |
| Control own behavior | | 1700 | 230 | 260 | 100 |
| | Not at all/Not very well | 8.2% | 6.1% | 3.7% | 16.9% |
| | Well | 44.1% | 49.0% | 22.2% | 49.5% |
| | Very well | 47.7% | 44.9% | 74.1% | 33.6% |
| Follow directions | | 1710 | 230 | 260 | 100 |
| | Not at all/Not very well | 16.3% | 15.4% | 9.3% | 23.8% |
| | Well | 59.1% | 62.5% | 51.2% | 51% |
| | Very well | 24.5% | 22.2% | 39.5% | 25.1% |
| Get along with others | | 1710 | 230 | 260 | 100 |
| | Not at all/Not very well | 5.0% | * | * | 8.3% |
| | Well | 57.7% | 62.6% | 43.3% | 60.1% |
| | Very well | 37.3% | 34.1% | 51.6% | 31.6% |

*Note:* * indicates too few cases to reliably report (i.e., less than 10 responses in the cell). ** indicates all cells were rounded to the nearest 10 to protect confidentiality of respondents.

Table 5

*Special Education Teacher Report of Social-Emotional Functioning for Students by Disability***

| Item | Response choices | Total Sample | SLD | SLI | ED |
|---|---|---|---|---|---|
| Ask for what they need | | 2910 | 180 | 160 | 110 |
| | Not at all well | 8.1% | 6.1% | * | * |
| | Not very well | 27.0% | 22.6% | 24.7% | 39.6% |
| | Well | 44.8% | 47.4% | 51.6% | 40.2% |
| | Very well | 20.1% | 23.9% | 20.1% | * |
| Control own behavior | | 2910 | 180 | 160 | 110 |
| | Not at all well | 2.6% | * | * | * |
| | Not very well | 15.1% | 9.1% | 6.4% | 39.0% |
| | Well | 53.3% | 56.9% | 56.0% | 39.4% |
| | Very well | 29.0% | 32.9% | 35.1% | 15.5% |
| Follow directions | | 2920 | 180 | 160 | 110 |
| | Not at all | 2.0% | * | * | * |
| | Not very well | 24.4% | 23.1% | 14.9% | 34.3% |
| | Well | 52.2% | 51.5% | 60.5% | 46.7% |
| | Very well | 21.5% | 25.2% | 22.2% | 15.2% |
| Get along with others | | 2920 | 180 | 160 | 110 |
| | Not at all | 1.3% | * | * | * |
| | Not very well | 11.5% | 7.6% | 6.0% | 27.6% |
| | Well | 61.4% | 64.6% | 59.7% | 57.7% |
| | Very well | 25.8% | 27.5% | 31.8% | 13.0% |

*Note:* * indicates too few cases to reliably report (i.e., less than 10 responses in the cell). ** indicates all cells were rounded to the nearest 10 to protect confidentiality of respondents.

Additionally, these items were the most relevant and directly related social-emotional items in the dataset. While additional items may have been pulled from other NLTS2 instruments from different respondents, research on survey data has shown that there is often poor correlation between different informants, including between parents and teachers and between teachers and students (Achenbach, McConaughy, & Howell, 1987). In the Achenbach, McConaughy, and Howell study, the researchers also identified the highest test-

retest reliability estimates for teachers, suggesting that use of different informants be minimized and that teacher data might be best suited for use in this study. Thus, the source of the independent variables in this study was from general education teachers and the students' special education case managers.

The dependent variable was enrollment in any form of postsecondary education after leaving high school, including 2-year colleges, 4-year colleges, vocational, or trade schools. This variable was analyzed dichotomously, either attending or not attending, and was pulled from Wave 4 Parent and Youth surveys (variable name mp4S3a_S4a_S5a_D4a1_D4a2_D4a3). Table 6 provides a breakdown of postsecondary enrollment for the entire NLTS2 sample and for the sample of students who received special education services under the categories of SLD, SLI, and ED before leaving their secondary schools

Table 6

*Percentages of Students Enrolling in Any Postsecondary Institution by Disability Category as of 2007*

| | Total sample | SLD | SLI | ED |
|---|---|---|---|---|
| Enrolled | 37.8% | 41.8% | 49.1% | 29.8% |
| Not enrolled | 62.2% | 58.2% | 50.9% | 70.2% |

**Analysis weighting**. Sampling weights were calculated by NLTS2 researchers to ensure that the proportion of students in the disability groups in the sample is reflective of the representation of disability groups in the population. Thus, SRI International recommends that when using data from multiple instruments to use the weights from the instrument with the smallest sample size

(2009). Additionally, when variability in responses from the sample is the dependent variable, it is recommended that researchers use both the full sample and all replicate weights. Both recommendations will be accepted for this study, resulting in use of full sample weight (i.e., wt_nts2: Teacher survey wave 2 full sample weight) and all replicate weights for the selected instrument.

**Statistical Analyses**

Preliminary analyses were calculated on the data using SPSS Statistics (IBM, 2009), specifically examining frequencies, percentages, means, and crosstabs examining levels of each independent variable across the dependent outcome variable for the unweighted and weighted sample.

Classification trees, also calculated using SPSS Statistics (IBM, 2009), were utilized to determine which social-emotional skills are the best predictors of postsecondary enrollment. Classification trees are a nonparametric procedure for identifying either population subgroups or independent variables that can predict an outcome of interest (Lemon et al., 2003). Generally, classification tree analyses independently examine all entered independent variables and report the strongest predictors for the dependent variable at each "level" of the tree. Typically, classification tree analyses report predictors in a binary manner, e.g. creating two "branches" for each split. For example, if the analysis showed that cognitive ability was the most important predictor of the dependent variable, the first level of the tree would be the levels of cognitive ability (presumably above and below a significant cut score). The analysis would then continue to run until no significant predictors remained. If cognitive ability was the only significant predictor in the

study then the tree analysis would be complete. If additional independent variables were identified they would be reported in order of significance, with the strongest predictors reported first.

SPSS provides four different methods for calculating classification trees (SPSS Inc., 2007). This study will use the QUEST (Quick, Unbiased, Efficient Statistical Tree) method. The benefits of the QUEST method are that it uses either an F test (for interval level data) or a chi-squared (for nominal level data) measure of significance for determining "splits," which allows the user to specify the level of significance for making the split. Significance for this study was set at $p < .01$. Further, the QUEST method allows for "surrogate variables" (imputation) to be conducted on missing values of independent variables. Additionally, the QUEST method avoids other methods' biases in favor of predictors with many levels (SPSS Inc.).

When creating classification trees for categorical dependent variables, the QUEST method utilizes either an F test or a chi-squared statistic to test significance for each predictor variable and the dependent variable (SPSS Inc., 2007). These values are computed in this analysis because each predictor variable is analyzed independently, thus a test of independence (chi-squared) is appropriate (Plackett, 1983). For this study, each of the predictor variables were tested independently regarding the dependent variable. The predictor with the strongest significance rating (based on F test or chi-squared) was reported first. The first graphical, binary "split" in the results represents the predictor with the highest correlation with the outcome variable, which continues until all significant

predictor variables are included in the tree (SPSS Inc., 2007). Since this analysis is able to evaluate each variable individually, it is also able to further determine the best "model" of predicting the dependent variable based on a combination of the independent variables (Feldesman, 2002). Hypothetically, if the classification tree analysis in this study determined that assertion skills (independent variable) were the most highly correlated with postsecondary enrollment for SWD (dependent variable), it could further report the next best predictor(s) for students with strong assertion skills. Thus, strong assertion skills may be the most highly correlated variable with the dependent variable, but adding strong self-management skills (an additional independent variable) may increase the effectiveness of assertion skills in predicting postsecondary enrollment. Additionally, if this is not the case, the graphical splits in the tree will reflect that, as well.

Similar NLTS2 studies examining various outcomes for SWD have used logistic regression analyses in determining predictor variables. In these studies, logistic regression was selected for its ability to assess the individual effects of multiple independent variables on a dichotomous dependent variable (Huck, 2004). Regression analyses have been used to examine the effects of individuals' characteristics, school programs, and academic achievement on postsecondary enrollment (Halpern et al., 1995; Wagner & Blackorby, 1996; Wagner, Blackorby, Cameto, & Newman, 1993; Wagner, Newman, Cameto, Garza, & Levine, 2005).

However, studies using large-scale datasets aimed at classifying subjects or participants and identifying predictor variables for outcomes of interest have found additional utility in using classification trees to analyze their data (de Ath & Fabricius, 2000; Camdeviren et al., 2007; Feldesman, 2002; Lemon et al., 2003). As identified by Feldesman (2002), there are several advantages of using classification trees over logistic regression. First, since classification trees are a nonparametric procedure, they are not subject to parametric assumptions regarding the normality of the distribution of the data, independence of the observations, and the homogeneity of variance. Additionally, this procedure allows any variables to be used typically without the need for any data transformation, as the significance testing treats each variable independently. Thus, a classification tree analysis will only report the significant variables that correctly predict the dependent variable, regardless of their scale of measurement.

This procedure also is not influenced by outliers in the data. Classification trees identify variables that best predict the dependent variable based on their frequency of correct "prediction" in the data. The dataset is partitioned into many nodes during the exploratory process, and as a result, the effect of outliers is confined into their own nodes. In other words, those outliers have no effects on other nodes and the efficacy of the overall result (Fielding, 2007). Further, classification trees are able to handle any combination of categorical and continuous predictor variables, which can be helpful when attempting to identify predictors of a specific dependent variable from a wide variety of independent

variables. Last, as discussed in a following section, classification trees are very useful when such large-scale datasets have missing data.

**Resampling**. In order to accurately assess the precision and validity of the classification tree model, the classification tree methodology also employs a cross-validation technique (SPSS, 2007). This technique involves the original sample being randomly partitioned into a set number of subsamples (in this case, 10) that are used to validate the results of the original classification tree analysis. One of the random subsamples is used to create a classification tree and then compared to the results of the same analysis for the remaining subsamples. Ultimately, this allows the results of the original classification tree analysis to be validated 10 times (in this study), providing estimates of the overall accuracy of the predictive model and the standard error (SPSS).

**Missing data**. Based on the longitudinal, complex nature of this dataset and sample, it was expected that there would be missing data (Allison, 2001). Thus, it is important to select procedures that are less influenced by missing data and are still able to provide robust results. An additional benefit of classification tree analysis, then, is the way in which it handles missing data. Typically, in logistic regression, missing data must either be omitted from analyses or estimated via imputation (Feldesman, 2002). Omitting the data is effective in ensuring inferences are not made based on incomplete data, but can be problematic if there is a large amount of missing data or if the data are not missing at random (Little & Rubin, 2002). In either case, though, important information is discarded in order to avoid creating faulty inferences.

On the other hand, imputation procedures can be used to estimate the missing values in the data based on the trends from the complete observations. While effective in restoring sample size, imputation also relies on the assumption that data are missing at random and is not free from measurement error or bias in its results (Little & Rubin, 2002). When a mean score is used to replace a missing data point (the manner in which surrogates are calculated for the QUEST method; SPSS Inc., 2010), the estimated variances and covariances are biased toward zero, whereas when using imputation by multiple regression the correlations are biased away from zero (Schafer, 1997).

When working with classification trees, however, missing data are not as complicated of an issue. This technique can allow observations with missing data to be analyzed together as an additional category, providing response bias information, or to be calculated through imputation (referred to as surrogates; SPSS Inc., 2007). Any existing patterns in the missing data are reflected in the completed classification tree, thus maximizing the information gained from analysis of the complete and incomplete observations (de Ath & Fabricius, 2000; Feldesman, 2002). The QUEST method employed in this study uses surrogates for missing values in predictor variables when determining the classification agreement (i.e., frequency of correct predictions), but does not consider them initially when calculating the best structure of the classification tree (SPSS Inc, 2010). Studies on the effectiveness of classification tree analysis compared to traditional logistic regression with large-scale datasets have shown a lack of significant differences in the results for datasets without significant amounts of

missing data (Feldesman, 2002) and more robust findings when used with datasets with a large amount of missing data (de Ath & Fabricius, 2000; Feldesman, 2002).

**Control variables**. Additionally, when using logistic regression to analyze data, it is important to appropriately identify potential moderating factors that may influence the dependent variable of interest and control for them. This allows researchers to analyze the observed differences in the dependent variable solely across the levels of the independent variables. When using a classification tree analysis, however, variables that would be controlled in a regression analysis can be included as predictors (Fielding, 2007). If those variables are significant the analysis will reflect their influence, but will continue to report the influence of the independent variables of interest across the different levels of the "control" variables. Ultimately, this provides a stronger analysis of the data. For example, if the results of this study showed that cognitive ability was the strongest predictor of postsecondary enrollment for SWD, it may also show that social-emotional skills (the independent variables of interest) are only significant predictors of postsecondary enrollment for students with low cognitive ability. Thus, based on previous research, this study additionally entered gender, ethnicity, disability category, socioeconomic status, and academic achievement into the classification tree analysis to allow more specific recommendations to be made about the impact of social-emotional skills on postsecondary enrollment for SWD.

Academic achievement was analyzed based on standard scores on reading comprehension and applied mathematics performance (mean of 100, standard

deviation of 15), which were entered as separate variables. Unfortunately, there was no measure of cognitive ability in the dataset selected for this study, but when considering the SWD that will be included in this study, the nature of their disabilities precludes low cognitive ability from being a factor that contributes to their typically poor outcomes. According to IDEA, in order for a student to be qualified under SLD or ED, low cognitive ability must be ruled out as a cause of their academic difficulties (IDEA, 2004). While the rule out does not exist in the legal definition of SLI, diagnostically it is defined as a language impairment in the presence of normal cognitive ability (Tager-Flusberg & Cooper, 1999). However, this does not protect SWD with average to above average cognitive skills from additional cognitive processing deficits, which stands as a limitation of this study.

# RESULTS

The purpose of this study was to explore the educational experiences of SWD and to determine if social-emotional skills contribute to postsecondary enrollment following exit from secondary institutions. As discussed, previous research has identified the importance of social-emotional skills for college readiness and transition to postsecondary education. Considering this body of research, it was hypothesized that social-emotional skills would predict postsecondary enrollment for SWD. Considering the exploratory nature of this study and lack of research on the influence of specific social-emotional skills, exploratory classification tree analyses were selected in order to determine the predictive power of social-emotional skills identified by general and special education teacher report. Thus, directional hypotheses were not tested, nor were specific skills hypothesized to be more influential than others in predicting postsecondary enrollment for SWD.

## Characteristics of the Analytic Sample

Examination of the outcome variable for the unweighted analytic samples showed that approximately 58.7 percent of the SWD included in this study enrolled in some form of postsecondary education, ranging from 60.3 percent of students with SLD, 61.1 percent of students with SLI, and 48.1 percent of students with ED (see Table 7). However, it should be noted that there was a high amount of missing data regarding postsecondary enrollment for the analytic sample (23.9 percent). The analytic sample was comprised of 39.8 percent SLD, 44.3 percent SLI, and 15.9 percent ED. After applying sampling weights, 52.3

percent of the analytic sample enrolled in postsecondary education, with 20.8 percent of responses missing. For the weighted sample, 49.7 percent of students with SLD enrolled in postsecondary education, compared to 64.2 percent for SLI and 63 percent for ED (see Table 8).

Table 7

*Unweighted Postsecondary Enrollment Rates for the Analytic Sample*

| | SLD | SLI | ED | Total sample |
|---|---|---|---|---|
| Enrolled | 60.3% | 61.1% | 48.1% | 58.7% |
| Not enrolled | 39.7% | 38.9% | 51.9% | 41.3% |

*Note:* No significant differences between groups. $F(2, 310^*) = 1.663$, $p > .05$ (**rounded to nearest 10 to protect confidentiality of respondents*)

Table 8

*Weighted Postsecondary Enrollment Rates for the Analytic Sample*

| | SLD | SLI | ED | Total sample |
|---|---|---|---|---|
| Enrolled | 49.7% | 64.2% | 63% | 52.3% |
| Not enrolled | 50.3% | 35.8% | 37% | 47.7% |

*Note:* Significant differences between groups, $F(2, 669{,}656) = 3989.51$, $p < .01$

Additionally, when weighted, the sample reflected 81.2 percent SLD, 5.3 percent SLI, and 13.5 percent ED. The weighted sample was predominantly white (69.9 percent; compared to 11.4 and 13.5 percent African-American and Hispanic, respectively), overwhelmingly male (72 percent), and fairly evenly distributed socioeconomically. Thirty percent was reported to come from households earning under $25,000 per year, 37 percent from households earning between $25,000 and $50,000 per year, and 33 percent from households earning over $50,000 per year. See Table 2 for these values.

Analysis of the dependent variable across the levels (Table 9) of the selected "control variables" showed that 30.6 percent of students from households earning under $25,000 per year enrolled in postsecondary education, compared to 39.4 percent from the $25,000-$50,000 category, and 84.3 percent from the over $50,000 category. Based on gender, 54.8 percent of male SWD enrolled in postsecondary education, compared to 45.9 percent of females. Across the available levels of ethnicity, 51.2 percent of white SWD enrolled in postsecondary education, compared to 57 percent of African-American SWD and 48.3 percent of Hispanic SWD.

Table 9

*Weighted Postsecondary Enrollment Rates for the Analytic Sample by Demographic Variables*

| | | Percentage Enrolled |
|---|---|---|
| Household Income | | |
| | <$25,000 per year | 30.6% |
| | $25,000-$50,000 per year | 39.4% |
| | >$50,000 per year | 84.3% |
| Gender | | |
| | Male | 54.8% |
| | Female | 45.9% |
| Ethnicity | | |
| | Caucasian | 51.2% |
| | African-American | 57% |
| | Hispanic | 48.3% |

**Educational Experiences for SWD**

In examining the educational experiences of SWD in this study, crosstabs were generated to explore the probability of each identified social-emotional skill contributing to postsecondary enrollment. Tables 10 and 11 examine the

dependent variable across the levels of each selected social-emotional skill for general and special education teachers. Review of Table 10 shows that the majority of general education teachers responded that their students demonstrated each of the social-emotional skills "Well," with the "controls behaviors" item rated most frequently as "Very well." Aside from this item, response trends generally indicated that students who attended postsecondary education were most likely to be rated as demonstrating each skill "Well" or "Very well." Students who did not attend postsecondary education were more frequently rated as "Not very well" on all of the items.

Review of Table 11 shows similar trends to those from Table 10, specifically that the majority of special education teachers responded that their students demonstrated each of the items "Well." Overall trends from special education teachers showed that students rated as "Well" or "Very well" on each of the items were more likely to enroll in postsecondary education. Students who did not attend postsecondary education had more varied social-emotional ratings, with the majority of responses falling in the middle categories: "Not very well" or "Well." Of particular note is that following directions and asking for what s/he needs in special education classes appear to have a stronger likelihood of association with the dependent variable than the other social-emotional items in this study.

Table 10

*Frequency of Weighted General Education Teacher Ratings of Social-Emotional Skills*

| Item | Not at all well | Not very well | Well | Very well | Total |
|---|---|---|---|---|---|
| Gets along with others | | | | | |
| Not Enrolled | 113 | 15,254 | 233,123 | 70,619 | 319,019 |
| | (.02%) | (2.3%) | (35.4%) | (10.7%) | (48.4%) |
| Enrolled | 0 | 11,514 | 172,594 | 156,273 | 340,381 |
| | | (1.8%) | (26.2%) | (23.7%) | (51.6%) |
| Total | 113 | 26,768 | 405,717 | 226,892 | 659,490 |
| | (.02%) | (4%) | (61.5%) | (34.4%) | |
| Follows directions | | | | | |
| Not Enrolled | 444 | 53,144 | 227,981 | 29,776 | 311,345 |
| | (.1%) | (8.2%) | (35%) | (4.6%) | (47.8%) |
| Enrolled | 5279 | 28,385 | 180,577 | 126,241 | 340,482 |
| | (.8%) | (4.4%) | (27.7%) | (19.4%) | (52.2%) |
| Total | 5723 | 81,529 | 408,558 | 156,017 | 651,827 |
| | (.9%) | (12.5%) | (62.7%) | (23.9%) | |
| Controls behavior | | | | | |
| Not Enrolled | 8290 | 17,262 | 146,030 | 147,031 | 318,613 |
| | (1.7%) | (2.6%) | (22.2%) | (22.3%) | (48.4%) |
| Enrolled | 0 | 20,684 | 149,345 | 170,233 | 340,262 |
| | | (3.1%) | (22.7%) | (25.8%) | (51.6%) |
| Total | 8290 | 37,946 | 295,375 | 317,264 | 658,875 |
| | (1.7%) | (6%) | (45%) | (48%) | |
| Asks for what s/he needs | | | | | |
| Not Enrolled | 24,449 | 64,256 | 160,257 | 69,651 | 318,613 |
| | (3.71%) | (9.75%) | (24.32%) | (10.57%) | (48.4%) |
| Enrolled | 14,556 | 81,055 | 131,704 | 113,067 | 340,382 |
| | (2.2%) | (12.3%) | (20%) | (17.18%) | (51.6%) |
| Total | 39,005 | 145,311 | 291,961 | 182,718 | 658,995 |
| | (5.9%) | (22%) | (44.3%) | (27.7%) | |

*Note:* Significant differences noted between all groups ($p < .01$)

Table 11

*Frequency of Weighted Special Education Teacher Ratings of Social-Emotional Skills*

| Item | Not at all well | Not very well | Well | Very well | Total |
|---|---|---|---|---|---|
| Gets along with others | | | | | |
| Not Enrolled | 0 | 28,264 (11.8%) | 69,047 (28.7%) | 17,575 (7.3%) | 114,886 (48%) |
| Enrolled | 0 | 10,054 (4.2%) | 57,453 (23.9%) | 58,130 (24.2%) | 125,637 (52%) |
| Total | 0 | 38,318 (15.9%) | 126,500 (52.6%) | 75,705 (31.5%) | 240,523 |
| Follows directions | | | | | |
| Not Enrolled | 151 (.1%) | 55,825 (23%) | 43,678 (18%) | 17,048 (7%) | 116,702 (48%) |
| Enrolled | 0 | 2820 (1.2%) | 67,078 (27.7%) | 55,739 (23%) | 125,637 (52%) |
| Total | 151 (.1%) | 58,645 (24.2%) | 110,756 (45.7%) | 72,787 (30%) | 242,339 |
| Controls behavior | | | | | |
| Not Enrolled | 314 (.1%) | 33,174 (13.7%) | 61,782 (25.6%) | 21,116 (8.7%) | 116,386 (48%) |
| Enrolled | 0 | 11,773 (4.9%) | 60,501 (25%) | 53,161 (22%) | 125,435 (52%) |
| Total | 314 (.1%) | 44,947 (18.6%) | 122,283 (50.6%) | 74,277 (30.7%) | 241,821 |
| Asks for what s/he needs | | | | | |
| Not Enrolled | 10,834 (4.5%) | 48,467 (20%) | 45,956 (19%) | 11,447 (4.7%) | 116,704 (48%) |
| Enrolled | 2469 (1%) | 15,774 (6.5%) | 51,182 (21.1%) | 56,212 (23.2%) | 125,637 (52%) |
| Total | 13,303 (5.5%) | 64,241 (26.5%) | 97,138 (40.1%) | 67,659 (27.9%) | 242,341 |

*Note:* Significant differences noted between all groups ($p < .01$)

**Social-Emotional Skills Predicting Postsecondary Enrollment**

This study also hypothesized that social-emotional skills, as identified by general and special education teachers, would predict postsecondary enrollment for SWD. Based on the lack of literature in this field, an exploratory classification

tree analysis was used in order to rank order social-emotional skills and "control" variables (i.e., academic achievement, gender, socioeconomic status, disability category, and ethnicity) in terms of their likelihood of correctly predicting postsecondary enrollment. In evaluating the significance of the split of the classification tree, either F test or chi-squared values were computed for each split. Significance values for correct prediction were set at $p < .01$. Overall, the classification tree model provided 74.7 percent accuracy in classifying whether a student enrolled in postsecondary education, with a standard error estimate of .001.

According to the classification tree analysis, the most important variable in predicting postsecondary enrollment for a nationally representative sample of SWD was how well the students were reported to follow directions in their special education classes ($F[1, 242328] = 86{,}710.7$, $p < .01$). See Figure 1 for a graphical portrayal of the tree structure for SWD based on special education teacher ratings of how well they follow directions. As discussed in the Method section, the classification tree analysis employed by this study (QUEST method) only makes binary splits for each significant predictor variable. Thus, the first significant predictor of postsecondary enrollment in this study is the social-emotional item from special education teachers regarding how well the student follows directions. This item is "split" based on Likert ratings of 1 or 2 (Not at all well or Not very well) and Likert ratings of 3 or 4 (Well or Very well). Closer inspection of the actual split (Nodes 1 and 2) show the postsecondary enrollment prediction accuracy for the values of the identified predictor. A score of 0 indicates not

enrolling, whereas a 1 indicates enrollment. For this item, 77.1 percent of students rated as following directions “Not at all well” or “Not very well” did not attend postsecondary education. Conversely, 56.1 percent of students rated as following directions “Well” or “Very well” enrolled in postsecondary education.

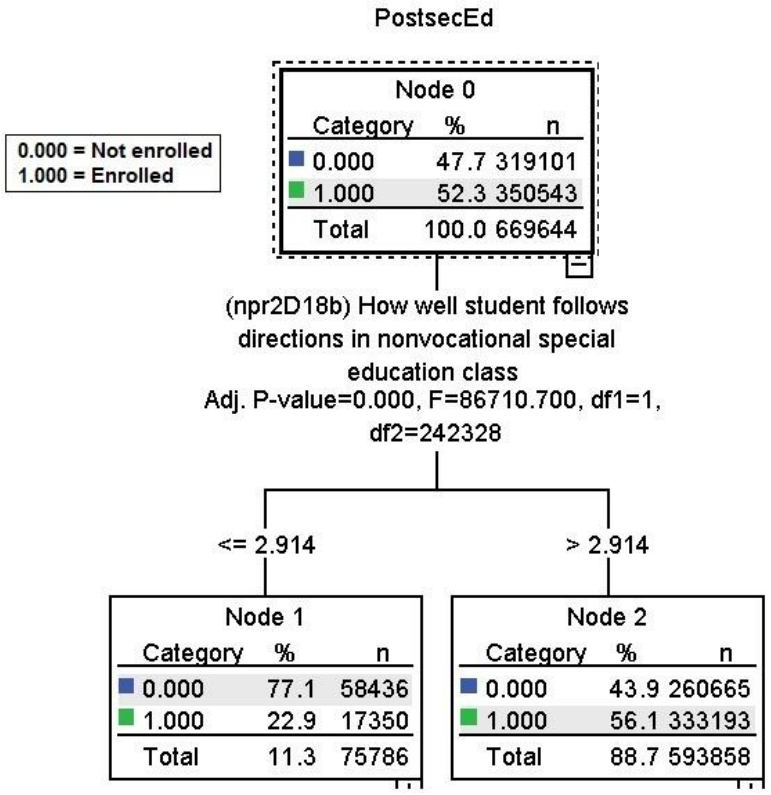


*Figure 1.* The first significant predictor of postsecondary enrollment in this study is the social-emotional item from special education teachers regarding how well the student follows directions. The split is made for students at a rating of 2.9, meaning that students rated as a 1 or 2 were significantly less likely to enroll in postsecondary education (77.1 percent did not) compared to students who were rated as a 3 or 4 in this skill (56.1 percent of these students enrolled).

Analysis of Figure 1 shows that in Node 0 (representing postsecondary education enrollment rates for all students in this study), 52.3 percent of students enrolled in postsecondary education. Based on the results of the classification tree analysis, the most significant predictor of postsecondary enrollment is "How well student follows directions in nonvocational special education class" ($p < .01$). The split is made for students at a rating of 2.9, meaning that students rated as a 1 or 2 were significantly less likely to enroll in postsecondary education (77.1 percent did not) compared to students who were rated as a 3 or 4 in this skill (56.1 percent of these students enrolled).

Figure 2 provides a graphical portrayal of the remainder of the classification tree for students rated with a 1 or 2 on how well they follow directions in special education classes. It is important to note that each branch of the classification tree only represents students that fit each of the significant splits. Thus, Figure 2 is comprised entirely of students who were rated as a 1 or 2 by their special education teachers in terms of how well they follow directions. For those students, their household income was the next significant predictor ($p < .01$), followed by either disability category ($p < .01$) or ethnicity ($p < .01$).

Figure 2 shows that this side of the tree, branching off of Node 1 from Figure 1 (students rated poorly on following directions in special education classes) represents 11.3 percent of the analytic sample, as this is the percentage of students rated poorly on this item. For those students, household income is the next significant "split," or predictor ($p < .01$). Nodes 3 and 4 show that of these students, 86.8 percent from households earning under $50,000 per year (either

"$25,000 or less" or "$25,001 to $50,000") did not attend postsecondary education. For poorly-rated "direction followers" from households earning over

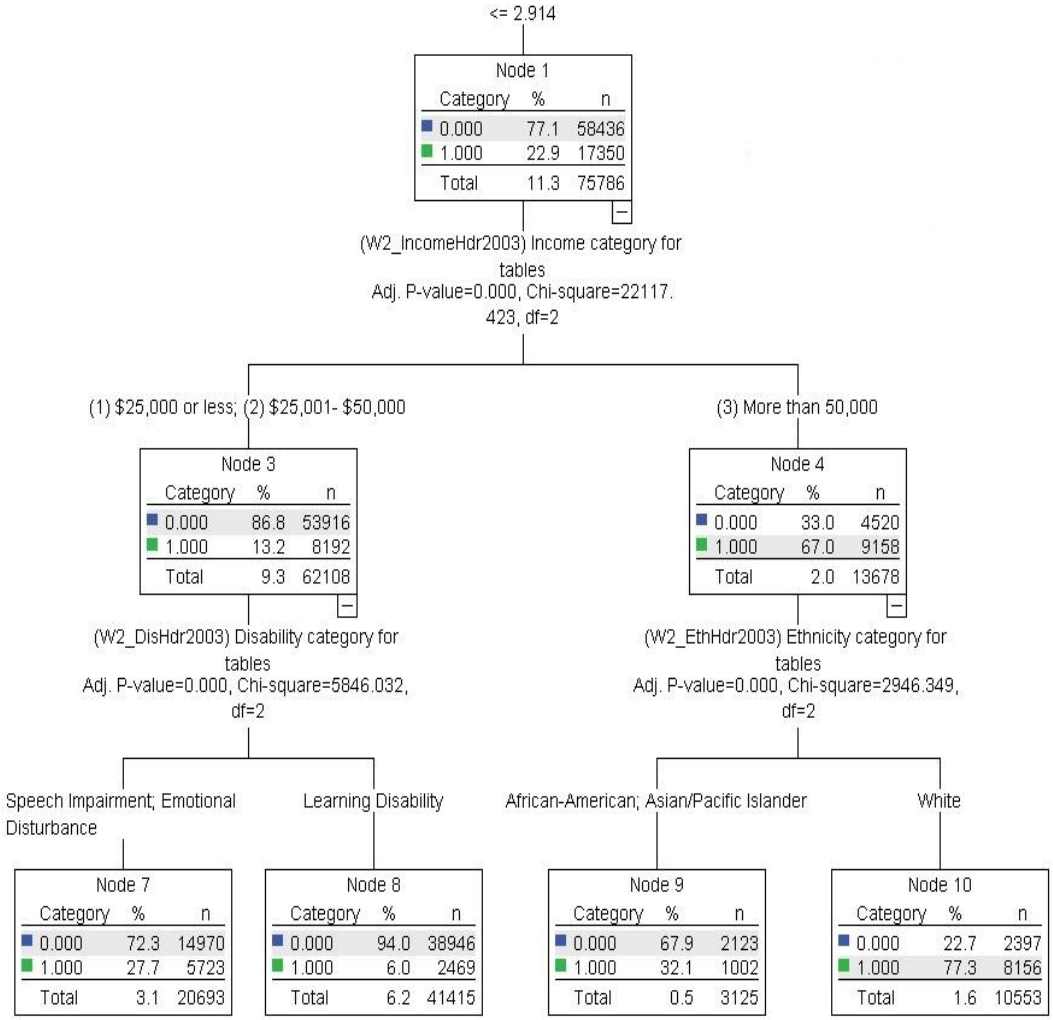


*Figure 2.* For students given a Likert rating under 3 on the item "How well does the student follow directions" in special education classes, household income was the next significant predictor of postsecondary enrollment. Household income was split at a reported income of $50,000 per year, with students from households earning under $50,000 per year less likely to enroll than those from households earning over $50,000 per year.

$50,000 per year, 67 percent attended postsecondary education. Interpretation of the classification tree could continue to another level, but an important note is that the students in this study who were least likely to enroll in postsecondary education were students with learning disabilities, from households earning under $50,000 per year, who were poorly rated by their special education teachers in terms of how well they followed directions (94 percent of these students did not enroll).

Figure 3 provides a graphical portrayal of the remainder of the classification tree for students rated with a 3 or 4 on how well they follow directions in special education classes. Again, each branch of this figure only represents students that were rated with a 3 or 4 in terms of following directions in special education classes. For these students, household income was also the next significant predictor ($p < .01$), followed by either "how well the student gets along with others" (for low income students) ($p < .01$) or disability (for high income students) ($p < .01$).

Examination of Figure 3 shows that this side of the tree (branching off from Node 2 in Figure 1) is also influenced by household income. Students rated highly on following directions (in special education classes) were much less likely to enroll in postsecondary education if their household income was under $50,000 per year. Of these students, 60.4 percent did not enroll in postsecondary education. For these students from households earning over $50,000 per year,

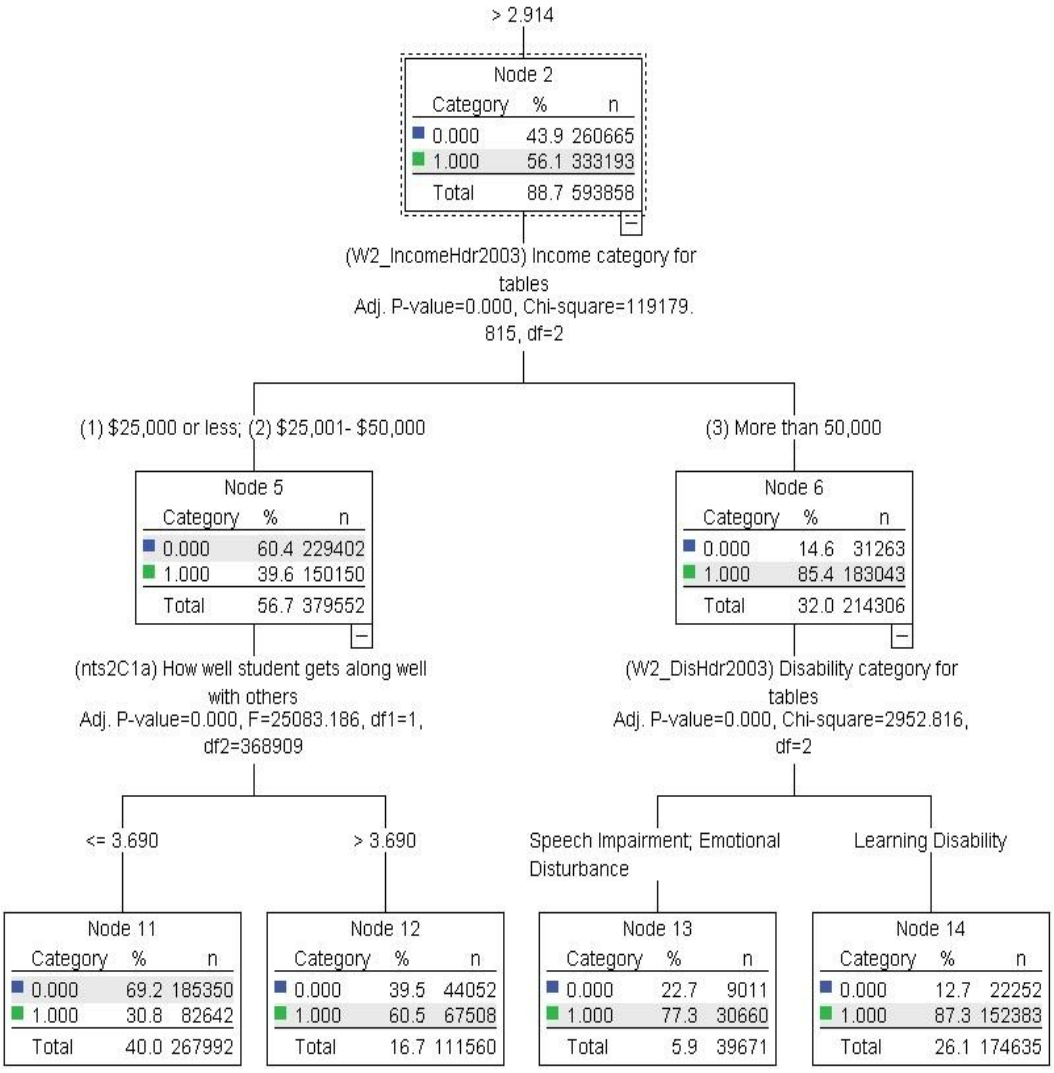


*Figure 3.* For students given a Likert rating over 3 on the item "How well does the student follow directions" in special education classes, household income was the next significant predictor of postsecondary enrollment. Household income was split at a reported income of $50,000 per year, with students from households earning under $50,000 per year less likely to enroll than those from households earning over $50,000 per year.

85.4 percent enrolled in postsecondary education. Again, while interpretation of the classification tree could continue, it can be more succinctly stated that students with learning disabilities, from households earning over $50,000 per year, who are rated highly by special education teachers in terms of following directions were the most likely to enroll in postsecondary education (87.3 percent).

Figure 4 is a graphical display of the top two identified predictors in this study; "how well the student follows directions in nonvocational special education classes" and household income. The percentages of students enrolling in postsecondary education across the levels of following directions and household income are provided in each presented node. Figure 4 shows that the item "how well the student follows directions in nonvocational special education classes" was the most accurate single predictor of postsecondary enrollment for SWD in this study ($p < .01$). The classification tree depicted in Figure 4 also demonstrates the added value of considering household income. For students rated poorly on "following directions," 77.1 percent did not enroll in postsecondary education. When adding low household income, the accuracy of prediction increases to 86.8 percent. On the other side of the tree, higher ratings on "following directions" accurately predicted 56.1 percent of students enrolling in postsecondary education. When adding higher household income, the accuracy increases to 85.4 percent.

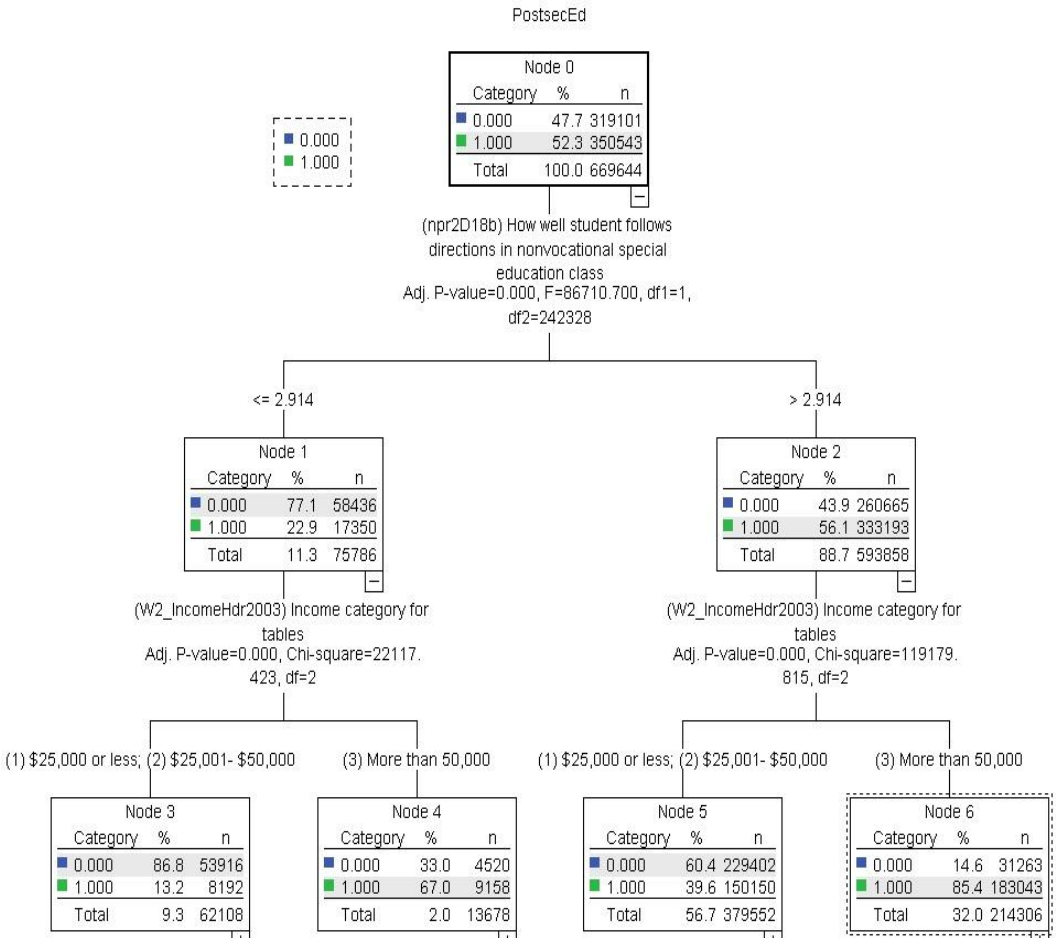


*Figure 4.* The top two predictors of postsecondary enrollment for SWD in this study were special education teacher ratings of "How well student follows directions in nonvocational special education classes" and household income. Students rated with low Likert ratings on this item who were from households earning under $50,000 per year were less likely to enroll (86.8 percent did not enroll) than students with high Likert ratings on this item who were from households earning over $50,000 per year (85.4 percent of these students enrolled).

# DISCUSSION

The purpose of this study was to explore social-emotional skills as a predictor of postsecondary enrollment for SWD using data from the NLTS2. Considering that students with significant medical or cognitive impairments may be unlikely to attend postsecondary institutions regardless of skills or intervention efforts, this study focused on students with high-incidence disabilities, namely SLD, SLI, and ED. The diagnostic criteria for these disabilities rules out low cognitive functioning (Tager-Flusberg & Cooper, 1999; IDEA, 2004), suggesting that these students possess cognitive skills similar to those of their peers without disabilities. Review of the research on postsecondary education and college readiness also indicates that social-emotional skills are important in assuring a successful transition to postsecondary education (Babbitt & White, 2002). Thus, it was hypothesized that social-emotional skills, as identified by teacher report of classroom behaviors, could be used to predict postsecondary enrollment for SWD.

Analysis of the characteristics of the analytic sample and the educational experience of students with high-incidence disabilities (i.e., SLD, SLI, and ED) showed that a higher percentage of SWD included in this study enrolled in postsecondary education (52.3 percent) than in previous studies looking at postsecondary enrollment rates for SWD (31.9 percent; Newman, 2005). The sample was predominantly white (69.9 percent), male (72 percent), and classified SLD (81.2 percent). When looking at the reported socioeconomic levels of the sample, the selected SWD are from a more diverse background, ranging from 30

percent of the sample from households earning under $25,000 per year to 37 percent from households earning between $25,000 and $50,000 per year.

Examination of postsecondary enrollment rates across all of the variables of interest showed a stark difference between SWD from households earning over $50,000 per year, with 84.3 percent of those students enrolling in postsecondary education compared to only 39.4 percent of students from households earning between $25,000 and $50,000, and 30.6 percent of students from households earning below $25,000. All other analyzed variables were fairly evenly distributed in terms of postsecondary enrollment: 54.8 percent of males and 45.9 percent of females; 51.2 percent of white SWD, 57 percent of African-American SWD, and 48.3 percent of Hispanic SWD; 49.7 percent of SLD, 64.2 percent of SLI, and 63 percent of ED.

Supporting previous research on the importance of social-emotional skills for postsecondary education (identified in terms of transition planning, college readiness, and postsecondary retention), the classification tree analysis determined that the social-emotional item "how well does the student follow directions in nonvocational special education class" was the most significant predictor of postsecondary enrollment. Specifically, students rated poorly on this item (i.e., either a 1 or 2 on the Likert scale) were less likely to enroll in postsecondary institutions than students rated highly on this item (i.e., Likert ratings of 3 or 4). Over 77 percent of students rated poorly on this item did not enroll in postsecondary education, compared to 56.1 percent of students rated highly on this item who did enroll. Consistent with previous research, household income

was the next strongest predictor (Alon, 2009), regardless of ratings of direction-following in special education classes. For income, $50,000 per year was the decisive splitting point. On both "branches" of the tree (for students rated both poorly and highly on this direction-following item), students from households earning over $50,000 per year were more likely to enroll in postsecondary education than were students from households earning $25,000 or less or between $25,001 and $50,000 per year. While it becomes increasingly difficult to interpret the classification tree as more branches are added to the analysis, it is important to note that for students with SLD, low direction-following and a household income under $50,000 per year led to 94 percent accuracy in predicting that these students would not enroll in postsecondary education. However, the model provided 87.3 percent accuracy for students with SLD from households earning over $50,000 per year who were rated highly on direction-following.

Lending further support to the positive impact of social-emotional skills on postsecondary enrollment for SWD, the item "how well student gets along with others" in general education classrooms was identified as a significant predictor. Specifically, this item was significant for students rated highly on direction-following in special education classes from households earning under $50,000 per year. Approximately 60 percent of lower-income students with highly rated direction-following skills (in special education classes) and highly rated ability to get along well with others (in general education classes) enrolled in postsecondary education. Considering that 88.5 percent of SWD who did not

enroll in postsecondary education were from households earning under $50,000 per year, it is vital to identify effective strategies that target such students.

As hypothesized in this study, the results of the classification tree analysis suggest that social-emotional skills, specifically compliance skills, play an important role in SWD attending postsecondary education regardless of the presence of other identified factors, such as socioeconomic status or academic achievement. The social-emotional item reflecting how well students follow directions in special education classes was the strongest predictor of postsecondary enrollment for the analytic sample, identified above any of the "control" variables, including academic achievement, income level, ethnicity, or gender.

Additionally, social-emotional skills provided added utility in predicting postsecondary enrollment for students from a lower SES background (households earning under $50,000 per year) that were rated highly in terms of their direction-following in special education classes. While it is clear that there are many variables that are correlated with postsecondary enrollment, the results from this study suggest that compliance skills and following directions are potentially as important as other identified factors (i.e. SES, ethnicity, gender, and academic achievement) despite the lack of previous research conducted on the relationship between social-emotional skills and postsecondary enrollment for SWD. These skills represented two of the top three predictors and suggest a stronger predictive power than other identified demographic variables.

## Limitations

This study demonstrated the importance of social-emotional skills in predicting postsecondary enrollment, but it is not without its limitations. First, this study provided an exploratory analysis of the relationship between social-emotional skills and postsecondary enrollment. Due to a lack of previous research exploring the nature of this relationship, this study used an exploratory, non-parametric procedure (classification trees) to confirm the existence of the hypothesized relationship. Additionally, the selected dataset had a large amount of missing data regarding the dependent variable (23.9 percent). While classification tree analyses are particularly robust when working with large amounts of missing data (de Ath & Fabricius, 2000; Feldesman, 2002), it cannot entirely overcome the high amount of missing responses as efficiently as an analysis conducted on a more complete dataset. Despite the use of the provided NLTS2 sampling weights, it is important to note that because of high amounts of missing data for some of the variables, the sample may not fully represent the population of students with high-incidence disabilities. Despite attempts to pull the data on postsecondary enrollment (dependent variable) from multiple waves and instruments, these data were missing for 20.8 percent of the weighted sample. For the remaining descriptive variables (disability, household income, ethnicity, and gender), only household income had any missing data (5.3 percent). It is also possible that the amount of missing data for the dependent variable, postsecondary enrollment, skewed the results. Over 52 percent of the analytic sample enrolled in postsecondary education, which is discrepant from previously identified rates of

32 percent (Newman, 2005). Since the dependent variable was pulled from parent surveys, it is possible that parents of students who did not enroll in postsecondary education were less likely to return the surveys, which could explain the discrepancy. Additional research is needed on this dataset in order to gain a more accurate approximation of current postsecondary enrollment rates for SWD.

Closer analysis of the splits in the tree suggests a difference between statistical and clinical significance. While being rated as a 1 or 2 in a student's ability to follow directions accurately predicted 77 percent of students who would not attend postsecondary education, being rated as a 3 or a 4 on the same skill only provided 56 percent accuracy in students who will enroll. This difference was found to be statistically significant, but positively predicting postsecondary enrollment for 56 percent of students rated high on direction-following may not be entirely useful in guiding intervention and improving outcomes. However, this limitation is where classification trees provide additional utility. Correct prediction of the outcome variable increased as more predictors were added to the model, providing an effective method of differentiating intervention efforts to varying groups of students, regardless of prior skill levels or demographic factors.

Further, assessment of social-emotional skills in this study relied on general and special education teachers' reports on four behavioral items (per respondent) rather than direct assessment of skills, raising some questions about the accuracy of the selected items in fully encompassing social-emotional skills. Items selected for this study mirrored a previously-developed construct of social-emotional skills (Caldarella & Merrell, 1996), but without data on the reliability

and validity of the NLTS2 instruments and selected items, it is difficult to assess the strength of results generated from use of these items. Review of teacher responses to the selected social-emotional items, as well, suggests a potential rating bias. Fewer students were rated as "Not at all well" or "Not very well" than the other response choices.

Additional data may also be needed to examine the differences between general and special education teacher ratings. Teacher ratings were compiled for the same students, yet the results suggest differences between students' observed skills in general and special education classes. It is possible that the unique demands of the general and special education classrooms provide differing perceptions on a student's skills or that the selected social-emotional items did not accurately assess skill differences.

The NLTS2 database, also, did not provide a measure of cognitive ability, making it difficult to rule out the effect of cognitive functioning or specific cognitive processing deficits that may make postsecondary education difficult or unlikely for SWD. While the guidelines for diagnoses of SLD and SLI – which comprised 86.5 percent of the analytic sample – preclude below-average overall cognitive ability from being a factor, this cannot protect the results against the influence of specific processing deficits. Based on a review of almost 400 studies on college students with SLD, Sparks and Lovett (2009) suggest that students with SLD may have small to moderate differences in cognitive ability from students without disabilities, favoring students without disabilities. Additionally, this study suggested that SWD have more uneven cognitive profiles than peers

without disabilities, lending credence to the notion that SWD may possess specific cognitive processing deficits that are not reflected in global measures of cognitive functioning (Sparks & Lovett).

It is also likely that there are other factors influencing postsecondary enrollment that were not included in this study. Parents' level of education, for example, is an additional variable that is associated with positive postsecondary outcomes (Dubow, Boxer, & Huesmann, 2009). Further, qualitative variables such as family interaction, child behavior, and adolescent aspirations are additional variables that may influence outcomes (Dubow et al.), and could be considered in future studies examining postsecondary enrollment rates for SWD.

**Implications and Future Research**

Research on post-educational outcomes shows that those outcomes are poorer on all measures for SWD, including job attainment (Braddock, 1999), lifetime earnings (Day & Newburger, 2002), and even life expectancy (Lleras-Muney, 2005). Thus, it is important to identify potential means of increasing these outcomes to ensure that SWD are continued to be afforded opportunities for success after completion of school. One identified avenue for increasing outcome measures for all students is postsecondary education (US Department of Education, 2010); however, SWD are significantly less likely to attend postsecondary institutions than peers without disabilities (Bureau of Labor Statistics, 2010; Newman, 2005).

In examining factors that increase postsecondary enrollment, there is a growing body of research on the impact of social-emotional skills on preparing

students for postsecondary education. College readiness literature, for example, has identified skills that are fundamentally social-emotional as critical for helping students prepare for college. These skills include self-awareness, taking responsibility, and the ability to develop social supports (Babbitt & White, 2002). Additionally, research on transition services for SWD has identified the importance of social-emotional skills in ensuring a successful transition from secondary education. Studies looking at successful transition programs, reviews of transition literature, and surveys of college service coordinators have identified social-emotional skills as either an important component or a deficit in SWD (Janiga & Costenbader, 2002; Sabbatino & Macrine, 2007; Webb et al., 2008). However, despite the budding research on the importance of these skills in postsecondary educational success, there is little research on whether these skills can predict SWD enrolling in postsecondary institutions.

The identification of predictors of postsecondary enrollment for SWD is important in guiding intervention efforts aimed at increasing the likelihood of SWD enrolling in education after high school, as this is currently a barrier toward improving outcomes for these students (US Department of Education, 2010). The present study provides an exploratory analysis of the impact of several teacher-rated social-emotional skills as they pertain to postsecondary enrollment. While the results from this study are promising in establishing the relationship between social-emotional skills, particularly compliance skills and peer-relations skills, and postsecondary enrollment, additional studies are needed to confirm this relationship and provide data on the predictive power of social-emotional skills.

Studies such as this should also be considered along with studies that have identified the skill differences between students with and without disabilities. Lane and colleagues (2006) found that students with SLD and ED possess lower levels of social competence than peers without disabilities, particularly for students diagnosed with ED. Lane et al.'s study, in conjunction with Kaprolet (2009), Cartledge (2005), Maag (2005), and this study, suggests the strong need for individualized social-emotional skills interventions for SWD. These students have been found to have lower social-emotional functioning than their peers without disabilities, but research has shown inconsistencies in the effectiveness of social-emotional skills training. As discussed by Cartledge (2005) and Maag (2005), this may be due to a lack of specificity when implementing social-emotional skills training without regard to individual needs. Previous research based on teacher perceptions identified different critical social-emotional skills for elementary-aged students across grade levels (Kaprolet, 2009). The present study found a significant relationship between compliance skills and peer relations in predicting postsecondary enrollment, which suggests that the broad construct of social-emotional skills may be too general to efficiently improve outcomes in this area. While the aforementioned studies were conducted independently using different datasets, it suggests a need for longitudinal research examining the effects of social-emotional skills training programs on all postsecondary outcomes, including enrollment in postsecondary education.

Due to the power and flexibility of classification tree analyses, and in light of studies identifying a need for more individualized social-emotional skills

training (Cartledge, 2005; Maag, 2005), it is recommended that additional studies be conducted using similar datasets in order to improve understanding of relevant factors in helping SWD attend postsecondary education. An additional feature of classification tree analyses, one that was not utilized in this study, is the ability to "force" the first splitting variable. For example, researchers working with data from low-SES school districts may choose to force the first split based on household income, allowing studies to examine predictors of any number of outcome variables based solely on their population of interest. SES, ethnicity, and gender are immutable factors; thus, it is important to understand how these variables change the prediction of outcome variables. As this study showed, the same variables are not necessarily as important of predictors when datasets are split based on high social-emotional skills and low social-emotional skills, which is also potentially true when looking solely at low-SES students or ethnic minorities in need of intervention.

Additionally, while identification of predictors is important in improving outcomes for SWD, it is also important to maximize intervention efforts for these students. If social-emotional skills do not play a role in success in postsecondary institutions, then intervention efforts may be more effective in other areas, such as academic ability or increasing financial resources for SWD. Social-emotional skills have been identified as important college readiness skills (Babbitt & White, 2002), but additional studies are needed to explore the protective factors that social-emotional skills provide for postsecondary SWD. Sparks and Lovett (2009) reported that these students typically have average academic achievement when

compared to students without disabilities, yet they continue to perform below peers without activities and are less likely to graduate with a degree. Tinto (1975) identified social-emotional skills as important factors in college retention, but again, it is difficult to determine the nature of their role. Considering the average academic achievement discussed by Sparks and Lovett (2009), it is possible that social-emotional skills prepare SWD to better take advantage of disability resources and engage with their classes, peers, and instructors.

In sum, this exploratory study provided support for the positive role of social-emotional skills in increasing postsecondary enrollment rates for SWD. SWD are significantly more likely to experience poor post-educational outcomes (US Department of Education, 2010), and considering that many important factors (i.e., cognitive ability, household income, or ethnicity) are largely immutable, any factors that may respond to intervention should be explored. While there is a lack of convergence in the literature on the role of social-emotional skills and postsecondary education, studies examining college readiness, successful transition programs, and college retention have similarly identified the positive impact of social-emotional skills. This study provides additional support for the importance of these skills, particularly emphasizing the positive roles of compliance and peer relations. These skills were identified as significant predictors of postsecondary enrollment and provide direction for social-emotional skills interventions aimed at improving post-educational outcomes. The results of this study should be used as a foundation for guiding further studies on social-emotional skills and long-term outcomes, and may provide the initial support

needed to initiate research using more comprehensive measures and experimental designs. Social-emotional skills have been identified as critical for increasing college readiness, the likelihood of students enrolling in postsecondary institutions, retention in postsecondary education, and overall post-educational outcomes for SWD, and their potentially far-reaching effects should continue to be explored.

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